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VOL. 23
9

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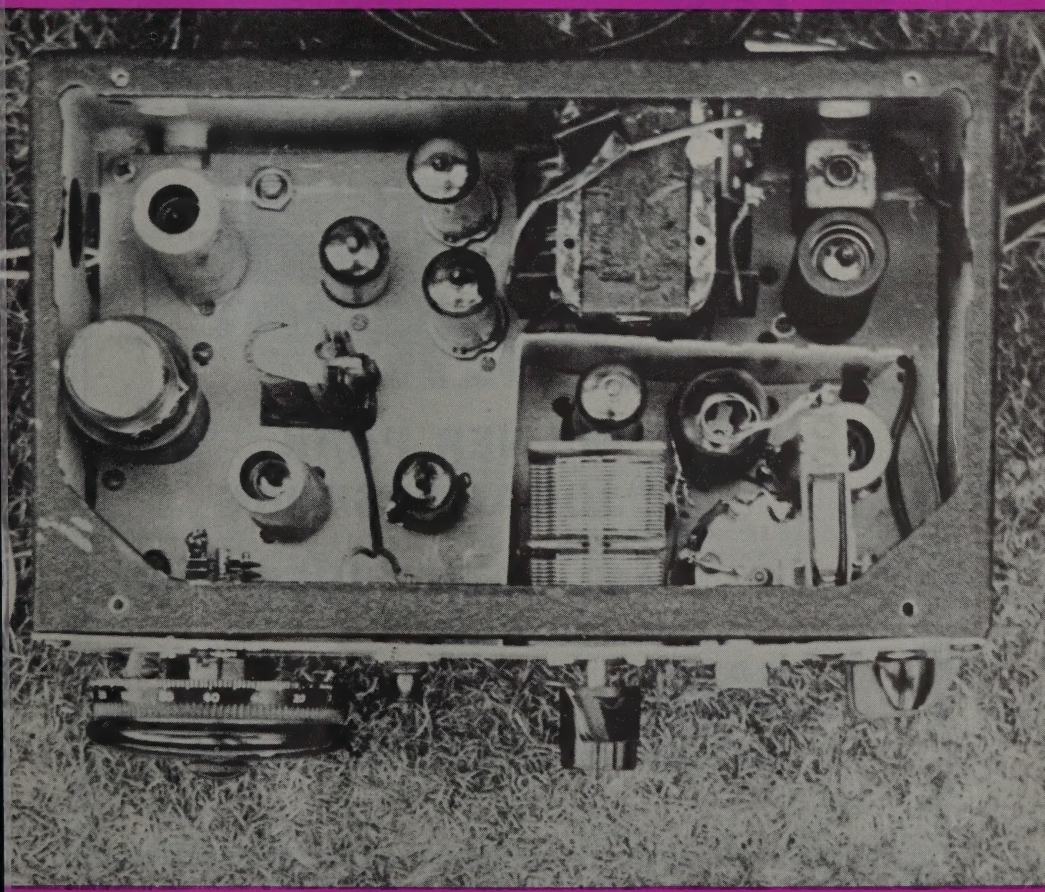

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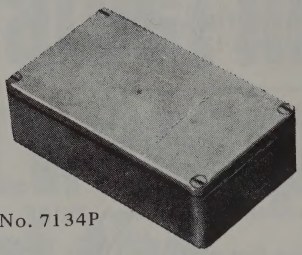

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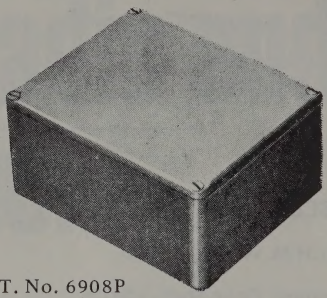

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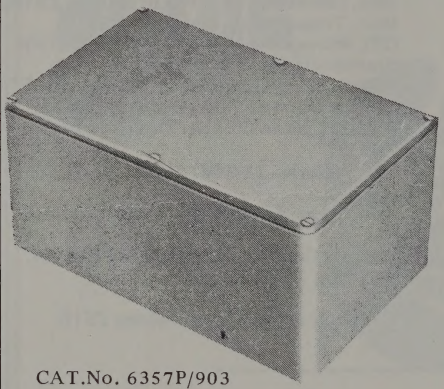

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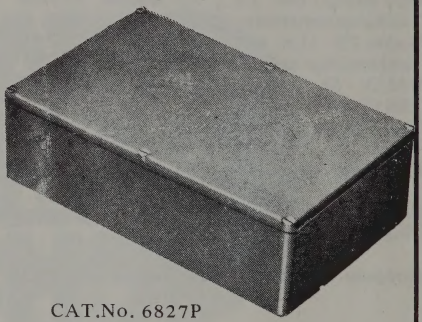

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CONTENTS/INHOUD

General/Algemeen

Apollo Programme Benefits mankind	21
Balance Sheetq	22
HQ Notes	24
Hamads	28

Technical/Tegnies

A 7 mhz Mobile Rig by D. M. Ashmore ZS6SX	5
A Sideband Package ZS Style II by E. P. Rosewarne ZS6WI	10
Use these Formulae and Calculations by A. H. Ritchie ZS6XK	11

Operating/Bediening

Amendments to Callbook No. 22	17
CHC Corner by Max Adler ZS1ACD	20
1969 CW Contest Results	26
Hou Koers Saamtrek 1969	27
Frequency Prediction Charts	27

Cover/Voorblad

D. M. Ashmore ZS6SX's 7 mhz mobile transmitter viewed from the top

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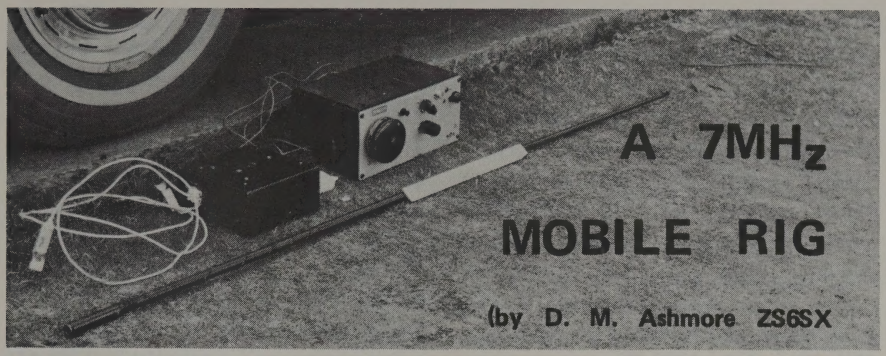


A 7MHz MOBILE RIG

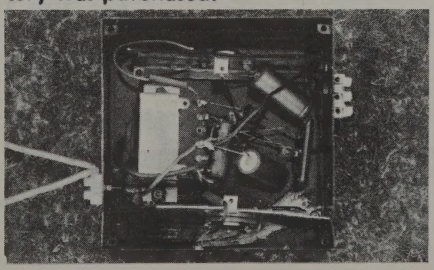
(by D. M. Ashmore ZS6SX

This transmitter was designed as a single band rig although it could easily be adapted to be a two band or three band device, since there was plenty of space remaining in the 10" x 4½" x 6" deep die-cast aluminium box. Working as a mobile station, good reports have been obtained from ZS4, ZS5, ZS6 although the opportunity to contact ZS1 and ZS2 have as yet not presented itself.

The rig as shown will work continuously for a good 8 hours with normal qso's and can be stretched easily to 10 hours for big nets on a 60 amp hour battery. The heaters of the 9 valves draw 1.75 amps only. Transistors could have been used in the modulator, but finally valves were chosen being less finicky to set up. Any receiver, naturally a transistor portable or car radio, covering Medium Wave may be used as the tunable I.F. for this unit.

THE P.S.U.

The P.S.U. is a conventional transistorized D.C. inverter with the transformer core measuring ⅝" square x 1" long. The transformer was the "E-1" type and was originally an audio output transformer. Other types may be tried, these resulting in slightly different frequencies of oscillation. The circuit, seen originally, was developed by the G.E.C. laboratories however instead of using 2 x GET573,2 x OC36 were used and give a frequency of oscillation of about 200 Hz. After operating for 6 hours the transformer was hot, no doubt due to hysteresis losses in the iron core since the windings were just slightly warm to the touch. The transistors were also just warm. The box used to house the P.S.U. is a 6" x 6" x 3½" type commonly employed as a distribution junction box in houses. The only smoothing found necessary was the 8uF electrolytic capacitor and to maintain high efficiency silicon diodes were used and 800 p.i.v. types were adequate. The unit possesses excellent regulation and with transmit and receive delivers 315 volts 180mA and 335 at 25 mA respectively. Since the author's car had a 6 volt system a separate 12 volt battery was purchased.



R. F. Section

The exciter is the usual type employing a Clapp v.f.o. on 3.5 MHz into a multiplier driver on 7MHz which delivers about 3½mA drive into a V.H.F. double tetrode QQE03/12 (a slightly higher power version of the QQE03/10) which is capable of 35 W D.C. input and has a B9A base. This transmitter runs at a D.C. input of 25W and tuning is accomplished by using a ¼ W peanut bulb coupled to the final coil because there was no room for a meter. To obtain best results from the v.f.o. a high mu valve must be used e.g. ER91, 6AM6, ER80 etc.

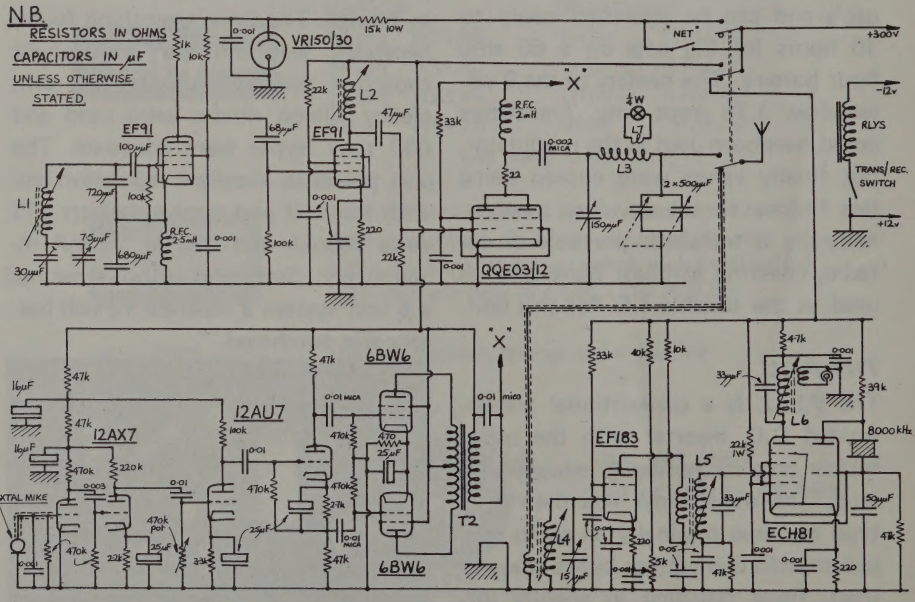
Modulator:

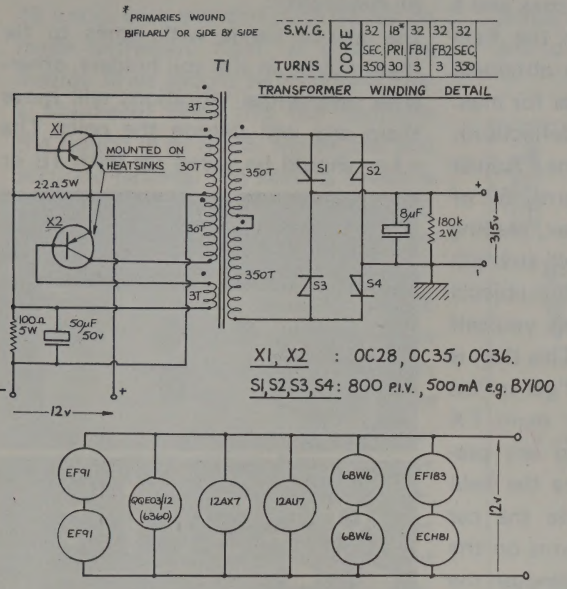
Modulation is given by a pair of 6BW6's in class AB1 although they do drift into class AB2 on modulation peaks. The quiescent anode current is 40 mA and this kicks up to 80 - 85 mA on speech. In the pre-amp of the modulator in the prototype a 12 AT7 was used in place of the 12A X 7 and was found to give more than enough gain into the 6BW6.

The modulator volume control is a trimmer pot and mounted inside the case on the chassis.

Receiver

Since most people possess a radio which can be used in the car, the receiving side uses a transistor portable or a car radio as the tunable I.F. An EF183 was used in the R.F. amplifier and this was followed by an ECH81 frequency changer with an 8MHz x-tal. Different xtals will give different I.F.'s and L6 may have to be changed to accommodate this. Two controls thus appear on the front panel viz. R.F. gain, R.F. tuning. To receive S.S.B. or C.W. use has to be made of the R.F. gain and the netting switch to resolve the signal by so called





COIL WINDING DETAIL

L1 : ALADDIN F804 WITH SLUG, 3/8" DIA., 32 S.W.G. ENAMELLED, WINDING 1" LONG, 100 TURNS.

L2 : 5/16" DIA. FORMER WITH SLUG, 100 TURNS 2 LAYERS, 36 S.W.G. ENAMELLED (7 MHz.)

L3 : 19 TURNS ON 1" DIA. PAXOLIN FORMER, 18 S.W.G. ENAMELLED, SIDE BY SIDE. (7 MHz.)

L4 : ALADDIN F804 WITH SLUG, 3/8" DIA., 40 TURNS, 32 S.W.G. ENAMELLED (7 MHz.). LINK WINDING 3 TURNS 24 S.W.G ENAMELLED AT EARTHY END.

L5 : 45 TURNS 32 S.W.G. ENAMELLED ON 5/16" DIA. FORMER WITH SLUG (7 MHz). 30 TURNS 36 S.W.G. ENAMELLED PILE WOUND OVER ABOVE WINDING.

L6 : 5/16" DIA. FORMER WITH SLUG AND SCREENING CAN, WINDING 2 LAYERS 1¼" LONG 34 S.W.G. ENAMELLED (950 kHz). LINK 5 TURNS OVER COIL AT EARTHY END, 24 S.W.G.

L7 : 2 TURNS, LINK COIL AT EARTHY END, 28 S.W.G. INSULATED INSIDE L3. ADJUST FOR SUITABLE BRILLIANCE OF BULB.

REF. R.S.G.B. HANDBOOK

T2 : 1+1:1 MODULATION TRANSFORMER.

"front-ending". This was in practice found to be no disadvantage. Although the receiving section is very sensitive it certainly is not noisy and weak signals can be copied easily except when an unsuppressed car passes you and that is when you feel your receiver falls down and you need a noise limiter! Try it!

Antenna:

The antenna used is a helical whip wound on a 4' 6" long glass fibre rod (with a bottom dia. of about ½"..) with ⅞ wavelength (say 115 feet on 40 metres before trimming) of about 20 s.w.g. enamelled copper wire. This is mounted at any convenient point of the car — in the author's case on the rear bumper. A longer antenna may be used, say, 8 feet rod which may be a more efficient radiotor. When winding the helical whip commence at the top (it is not necessary to have a variable winding pitch) and keep on winding, staggering only the last few turns down to the base. The method of mounting the rod is left to the individual, however with the prototype, the rod is pushed into a brass bush (5" long) about 3" so that it fits tightly. The other side is threaded on the inside and this bush screws onto a steel pin mounted in a brass base. This brass base is fixed on a steel plate being insulated from it by mica (or paxolin if preferred).

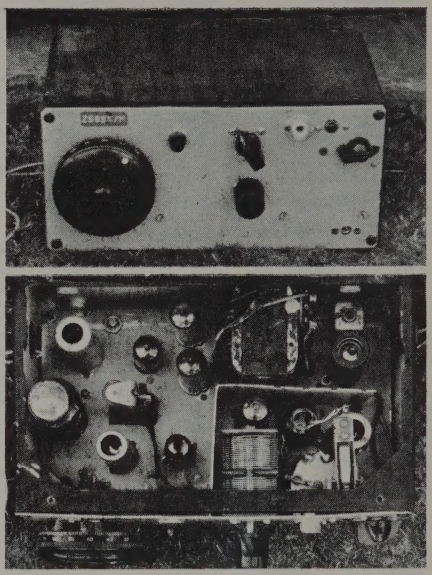
Tuning the antenna:

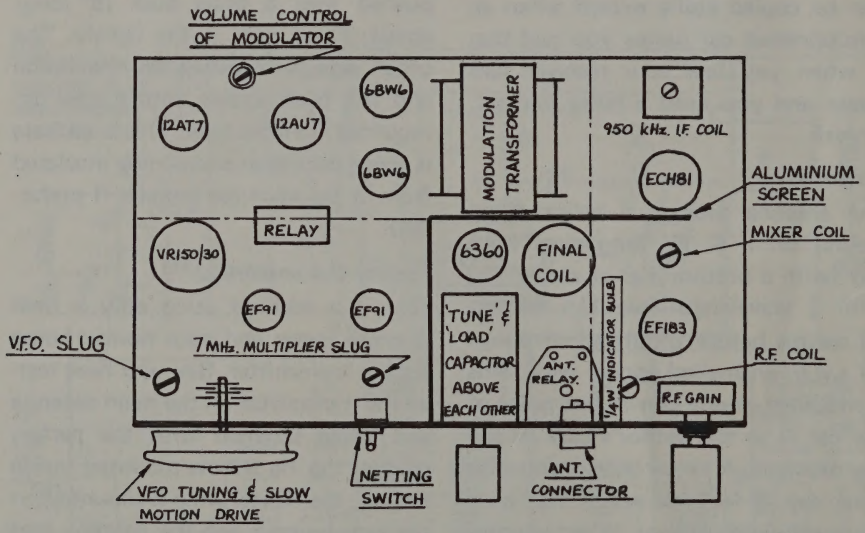
This is a method using only a field strength meter and your normal home station transmitter. Say you have tested the transmitter on the main antenna and being satisfied with the performance, the rig is now mounted inside the car, the helical whip is mounted on the rear bumper and the antenna lead is inside the cabin of the car. Put a signal on say 7060 KHz with your big TX (during evenings?) and by

coupling the helical via the coax and a 2 turn link to the coil on the field strength meter a reading is obtained. Tune the field strength meter for max. reading (say $\frac{1}{8}$ of full scale deflection). Now leave the meter alone. Adjust the helical by removing turns, 6" of wire at a time until the max, reading is reached shown by the field strength meter. N.B. do not have any objects near the antenna, including yourself while taking these readings. This then is approximate resonance. To get it "on the nose" switch off your main TX and use the mobile TX on any predetermined frequency. Place the field strength meter just outside the car and tune up. Adjust the turns on the helical whip until max. reading on the field strength meter is obtained. It may be necessary to take off as little as 1" on this operation. Once this is done the helical is resonated and you are ready to go.

In conclusion:

Use elastic bands with cores to fix them rigidly in the coil holders, otherwise mechanical vibrations will move them and will detune the coils. The v.f.o. should be wired up with 18 or





SUGGESTED CHASSIS LAYOUT

(REFER PHOTOGRAPH ON COVER)

16 s.w.g. wire and this stage should be made extremely rigid. A good slow motion drive should be employed (say a Muirhead) since this will facilitate the tuning in of S.S.B. signals and also accurate netting. The netting switch is push button type (no return spring). There should be an aluminium or tin-plate screen around the P.A. stage and associated circuitry, also across the QQE03/12 valve base underneath the chassis. There should also be a screen across the EF183 valve base. The transmit/receive switch is on the microphone and is the ordinary bedside light type of switch i.e. push to close, push to open. All connecting wires should be insulated and connections bound to the lug before soldering.

The circuit is not complicated and should act as a good introduction to mobile work. This rig really does work, but should any constructors run into difficulties, the author is more than prepared to enter into correspondence and to offer his opinions.

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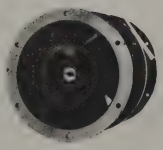

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A SIDEBAND PACKAGE ZS STYLE

by E. P. Rosewarne ZS6WI

The following "tailpiece" of ZS6WI's excellent article was inadvertently omitted last month. Our apologies to the author and the readers on this matter. (Is my face red! — Editor).

BIAS SUPPLY

A "stiff" bias supply is essential for good linear operation of the final amplifier. The supply used makes use of a 2A3 shunt regulator, which is capable of holding the voltage constant within load variation of 0 to 80ma. It was taken from an early edition of the A.R.R.L. Sideband Manual. In the interest of longer tube life it was thought desirable to delay the application of H.T. until all filaments had reached their operating temperature. The 5 volt rectifier heater winding of the mains transformer not being used, provides the necessary A.C. for the thermal time delay heater. The 40 volt bias supply activates the H.T. relay Once the bi-metal switch in the termal closes switching on the H.T. At the same time the 5 volt A.C. to the heater of the time delay relay is broken. The relay is held in the energised position by the relay opening, cutting off the H.T.

GENERAL

A project such as an all-band sideband transmitter is not likely to be undertaken by an amateur without previous constructional experience, so no attempt has been made to give a wire by wire description of the construction. Believing that an ounce of prevention is better than a ton of cure, rather elaborate shielding and by-passing of power leads has been used. A would-be constructor could benefit by reading an article in Q.S.T. entitled "Just like Q.S.T. except . . . . "

The crystal frequencies given are those used by the author for a particular filter. Similarly the V.F.O. frequencies were chosen to match the carrier crystal, and to give a neat looking dial. The crystal for 40 metre was chosen as 3150 to place the second harmonic of this crystal as far away as possible from the 40 metre band. A trap is included in the design to attenuate this harmonic.

Sufficient gain is available on all bands and care in necessary not to over-drive the final. With the correct adjustment of the limiter this should not be possible.

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Use These Formulae and Calculations

by A. H. Ritchie ZS6XK

Some time ago the Editor of Radio-ZS wrote to me and said that I should not specify a coil as being 10 microhenries as it might put some prospective experimenter off, that I should specify coil diameter and length, number of turns, guage of wire and so on. Well this surprised me, because, what put me off when I first started on ham radio was that I didn't have and couldn't get a coil former $1\frac{1}{4}$" diameter and $1\frac{1}{2}$" long! That was also when I took a good look at the formulae, for all sorts of calculations, to be found in the Handbooks. Generally speaking they are to be found spread out in a number of chapters. To save time looking them up, I now have the most used formulae written out and pasted on to the first page of a scrap book. Incidentally the RSGB has a nice little summary of formulae at the end of their handbook, under the heading of Data.

The formulae most used are:-

1. **Ohms law for calculation of Voltage, Current and Resistance.**

1,000 x E (Volts) = I (Current in Milliamps) x R (Resistance in Ohms)

2. **Power (Watts).**

E (Volts) x I (Current in Milliamps).

3. **Resonance (Frequency, Inductance and Capacity).**

$$\text{f (kilohertz)} = \frac{10^6}{6.28\sqrt{\text{Inductance (in Microhenries)} \times \text{Capacity (picrofarads)}}}$$

4. **Inductance of Coils**

$$\text{L (Inductance in microhenries)} = \frac{(\text{Radius in inches})^2 \times (\text{Number of turns})^2}{9 \times \text{Radius in inches} + 10 \times \text{length of coil in inches.}}$$

5. **Reactance of Inductance at Specified Frequency.**

XL (Reactance in Ohms) = 6.28 x frequency in megahertz x inductance in microhenries.

6. **Reactance of Capacity at Specified Frequency.**

$$\text{Xc (Reactance in Ohms} = \frac{10^6}{6.28 \times \text{frequency in megahertz} \times \text{capacity in picrofards.}}$$

7. **Turns Ratio.**

$$\frac{\text{Np (Number of Primary Turns)}}{\text{Ns (Number of Secondary Turns)}} = \frac{\sqrt{\text{Zp (Primary Impedance in Ohms)}}}{\sqrt{\text{Zs (Secondary Impedance in Ohms)}}}$$

For the benefit of the newcomer, or perhaps the older experimenter who was never called upon to write any technical examination let me explain how and when I use each of them. Remember, that what follows is set out in as simple a manner as possible without any attempt to get involved in any of the many side issues. This explanation is necessary, otherwise, the experts will get back at me with what about this and what about that. All the "this' " and "thats' " really don't affect the issue a great deal.

Now let us see how and when these formulae are used:-

1. Ohms Law:

(a) Reducing Voltage by means of Dropper Resistor.

The supply voltage is known (say) 500 volts the required voltage is say 300 volts at 25 millimaps. E is therefore (500-300) and I 25.

So $1{,}000 \times 200 = 25 \times R.$

$$R = \frac{200 \times 1{,}000}{25} = 8{,}000 \text{ Ohms.}$$

The wattage of resistor required is

$$200 \times \frac{25}{1{,}000} = 5$$

(b) Calculating Dropper resistor for Voltage Regulator Tube.

The supply voltage is assumed to be 250 and controlled voltage 150. The maximum current passed by the VR tube is say 40 ma.

E is (250-250) and 1 is 40.

So $1{,}000 \times 100 = 40 \times R.$

$$R = \frac{1{,}000 \times 100}{40} = 2{,}500 \text{ Ohms}$$

Wattage of Resistor is $\frac{100 \times 40}{1{,}000} = 4.$

(c) Calculation of Grid Bias.

(i) If bias is provided by means of a cathode dropping resistor then the value of bias resistor is determined using Ohms law as in previous examples.

1,000 E (Bias voltage) = 1 (Current passing through Cathode)
X R (Bias Resistor).

This is used mostly in Class A Circuitry.

(ii) Where bias is applied through a grid resistor the calculation is the same except that I is represented by the grid current. If say bias is given as - 45V and maximum grid current as 6 ma, then it is advisable to choose a value of grid resistor which will give a safe value of grid current. In this example let us say 4 ma is accepted. Then the value of resistor required is

$1{,}000 \times 45 = 4 \times R.$

$$R = \frac{1{,}000 \times 45}{4} = 11{,}250 \text{ Ohms.}$$

If we only have a 15,000 Ohm resistor available a calculation using this value is necessary so

$1{,}000 \times 45 = 1 \times 15{,}000$

$$I = \frac{1{,}000 \times 45}{15{,}000} = 3$$

This means that by adjusting the drive from a previous stage to give 4 ma through a 15,000 ohm resistor we get 45V bias.

(d) Calculation of Impedance (Resistance).

The most frequent impedance requirements are those of plate for AM requirements or matching of transistors to coils and transformers. This really presents no great difficulty.

(i) Let us take a transistor which has 12. volts on the collector and passes

5000 milliamps. The impedance to which it must be matched to give the maximum transfer of power is

1,000 x E (12 volts) ÷ I (500 milliamps) x R ohms.

$$R = \frac{1{,}000 \times 12}{500} = 24 \text{ ohms.}$$

Where a transistor is operating class B it only conducts on half cycles so the impedance is twice 24 = 48.

(ii) Plate impedance matching for transformers is also calculated simply. If a tube is to be coupled to a transformer the plate impedance must be matched to the transformer impedance to give the most efficient transfer of power.

If plate voltage is 300 and current 50 ma then impedance calculation is

$$1{,}000 \times 300 = 50 \times R$$

$$R = \frac{1{,}000 \times 300}{50} = 6{,}000 \text{ ohms}$$

2. Resonance

The next most common need is to know what inductance with what capacity is resonant at a particular frequency. Formula No. 3 now comes into its own.

(a) What inductance is needed to tune to a specific frequency with a particular value of capacity. Assume you want to tune to 3.5 megahertz with a capacity set at about 200 pf.

$$3{,}500 = \frac{10^6}{6.28\sqrt{L \times 200}}$$

$$3{,}500 \times 6.28\sqrt{L \times 200} = 10^6$$

$$\sqrt{200\ L} = \frac{10^6}{3{,}500 \times 6.28}$$

$$200\ L = \left(\frac{10^6}{3{,}500 \times 6.28}\right)^2$$

$$L = 10.34$$

(b) Knowing the inductance of a coil, what frequency range will it cover using a variable condenser with capacity of 10 to 350 pf. Assume the inductance to be 12. We first calculate the frequency at 10 pf.

$$f = \frac{10^6}{6.28\ \sqrt{12\ \times\ 10}}$$

$$f = \frac{10^6}{6.28\ \sqrt{\ 120}}$$

$$= \frac{10^6}{6.28 \times 10.95}$$

$$= \frac{10^6}{68.766}$$

$$= 14{,}542 \text{ Khz.}$$

Now the frequency is calculated at 350 pf.

$$f = \frac{10^6}{6.28\sqrt{12 \times 350}}$$

$$= \frac{10^6}{6.28\sqrt{4{,}200}}$$

$$= 2{,}457 \text{ Khz.}$$

The frequency range will therefore be, in round figures 2.5 to 24.5 mhz.

3. Calculation of Inductance.

The next stage of information which one requires to know is the calculation of inductance. As practically all coils which one has or is required to wind are single layer coils Formula No. 4 now comes in to use.

(a) The inductance required is 10 and coil former available is 1 inch diameter and $1\frac{1}{2}$" long. How many turns are required.

$$10 = \frac{(.5 \times .5) \times N^2}{9 \times .5 + 10 \times 1\frac{1}{2}}$$

$$= \frac{.25 \times N^2}{4.5 + 15}$$

$$= \frac{.25\ N^2}{19.5}$$

$$.25N^2 = 19.5 \times 10.$$

$$N^2 = \frac{195}{.25} = 780.$$

$$N = 27.9 \text{ Turns. (Say 28 Turns).}$$

(b) From some surplus equipment you have salvaged a coil $1\frac{1}{2}$" in diameter 2" long with 20 turns.

What is the inductance.

$$L = \frac{.75 \times .75 \times 20 \times 20}{9 \times .75 + 10 \times 2}$$

$$= \frac{225}{26.75}$$

$$= 8.41$$

Inductances (Coils) and Capacitors (Condensors) have varying Reactance at different frequencies. Knowing these is important for matching purposes. The formulae used are Nos 5 and 6.

4. Reactance of Inductances.

How can the low impedances of transistors be matched to the higher impedances of tuned circuits. When one tries to produce condensor and coil combinations to match up the low impedances one invariably ends up with ridiculously low inductances and fantastically high capacities niether of which are really practical.

What I usually do is take a coil and condensor combination which will tune to the frequency required and then tap down on the coil at a point where the impedance will match that of the transistor collector or emitter.

Let us take coil in example 3 (a). The inductance is 10. The capacity required to tune it to 3.5 mhz is calculated from formula 3 and works out at 206.93 pf. A variable condensor with maximum capacity of 250/300 pf will therefore be suitable.

Next calculate the impedance of the coil at 3.5 mhz. Using formula 5.

$$XL = 6.28 \times 3.5 \times 10.$$

$= 219.8$ (say 220 ohms)

Referring back to example 4 let us match a transistor impedance of 48 ohms.

Formular 7 now comes into use.

$$\frac{28}{Ns} = \sqrt{\frac{220}{48}}$$

$$\frac{28}{Ns} = \sqrt{4.58}$$

$$\frac{28}{Ns} = \frac{2.14}{1}$$

$$2.14\ Ns = 28$$

$$Ns = \frac{28}{2.14}$$

$$= 13.$$

Tap at 13 turns for 48 ohm impedance.

10. At times it becomes difficult or rather not practical to tap a coil. The same effect can be obtained by using condensors in series across the coil. Using the coil in example 9.

$$\frac{Cp}{Cs} = \sqrt{\frac{Zp}{Zs}}$$

$$= \sqrt{\frac{220}{48}}$$

$$\frac{Cp}{Cs} = \frac{2.14}{1}$$

Now using say 200 pf for Cp we have

$$\frac{200}{Cs} = \frac{2.14}{1}$$

$$2.14cs = 200$$

$$Cs = \frac{200}{2.14}$$

$$= 93.4 \text{ pf.}$$

A tap at the junction of the two condensors will have an impedance of 48 ohms.

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+ZS1FT H. Forrer, Posbus 14, VANDERSTEL. K.P.
+ZS1JV J. Venter, Stafhuis 5, Stikland Hospitaal, Bellville.
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ZS4QA A. P. Burger — delete — see ZS1QA

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ZS5AQ O. G. Rees, 337 Cato Road, DURBAN.
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ZS6BI H. G. Drummond, 41, St. Domenic Road, Edenvale, (Box 11277). Johannesburg.
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ZS6B1W P. J. Sammon — delete — see ZS5BI (see Call Book)
ZS6BJF B. J. du Preez, 64 Langerman Street, Mayfair, JOHANNESBURG.
ZS6BJG Mrs. S. E. Du Preez, 64, Langerman Street, Mayfair, JOHANNESBURG.
ZS6BJM A. Roberts — deleted by P.M.G.
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CW section, sponsored by International CHC/FHC administered by CHC Chapter 73, starts 0001gmt Saturday 6th Dec. 1969 and ends 2400gmt Sunday 7th Dec. 1969. SSB section, sponsored by International CHC/FHC administered by CHC Chapter 88, starts 0001gmt Saturday, 13 Dec. 1969 and ends 2400gmt Suncay 14 Dec. 1969
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for each CHCer, not a Chapter member worked . . . . . 2 points
for every other contact whatsoever during contest . . . . 1 point.
A bonus of 50 may be added to each full 100 points attained, BEFORE use of multiplier, for single band entries on 80 and 160 metres ONLY. Count double points for all contacts outside own continent. Contact, is SSB, with HQ station K6BX is 3 extra points.

MULTIPLIER: is number of DIFFERENT ARRL Countries worked on each band.

EXCHANGE NUMBERS & LOGS: Exchange numbers usual 5/6 figures – i.e. RS/T plus progressive contact starting from 001, then followed by entrant category such as &73, /CHC, /FHC of /HTH (All non-CHCers are automatically HTH). Use only GMT. Logs MUST show DATE/TIME, Station wrked, Exchange sent & received, Band, and contact points claimed. Summary sheet should reflect contact points separately for each band and multiplier for each band. EACH BAND is scored separately and then totals of each band are added together to arrive at final total score claimed. LOGS FIGURES IN ANY OTHER WAY WILL BE DISQUALIFIES.

Summary sheet should also show, IN BLOCK LETTERS, applicant's full name, call, QTH, and Zip code (if any). Indicate clearly if entry is for single band or all bands. Entry CANNOT be for both.

AWARD CREDITS: The submitted logs in both sections of above QSO Parties may be used in lieu of QSL and/or GCR when applying for any awards issued by CHC HQ, CHC Chapter 73, and CHC Chapter 88.

APOLLO PROGRAMME BENEFITS MANKIND

"The Apollo 11 landing on the moon has more significance in every day life than is generally accepted", said Robert E. Chasen President of the ITT Federal Electric Corporation, NASA prime contractor for Apollo at Cape Kennedy, Houston and Huntville, associates of Standard Telephones and Cables (SA) (Pty) Ltd.

"Our age has benefitted far beyond the advances it has made in space travel. We have already seen", he said, "the benefits from weather satellites, which can give us early warning of hurricanes. In addition, there have been many electronic improvements and new products developed as a result of America's space programme. Medical technology has moved far ahead. Even manufacturing processes have been advanced to the brink of a new industrial revolution.

Mr. Chasen pointed to three major areas which have benefitted by the space programme research.

1. In medicine: human pulse and heart beats can be relayed instantly to medical specialists thousands of miles from the patient for immediate analysis: computer techniques to clarify and enhance photos photos of the Moon and Mars are being used to produce better and more clearer X-rays: a tiny specialised radio transmitter used by astronauts has been adapted for use in hospitals. If breathing or pulse stop or become abnormal an alarm is sounded at the nurses' station: space helmets have been modified to measure oxygen use by patients.

2. In industrial fields: one of the major benefits has been the reduction in size of electronic equipment; at a concurrent increase in reliability new lightweight metals which are tremendously strong have been developed, and are in common use.

3. Cryogenics – the science of working with ultra-cold metals – has been developed in aerospace to produce side benefits ranging from new industrial techniques to improved methods of brain surgery: management concepts, developed to synchronize efforts on a nation-wide basis, are helping industry produce more higher quality goods and services at less cost.

SOUTH AFRICAN RADIO LEAGUE - HEADQUARTERS

BALANCE SHEET AT 30TH JUNE, 1969

1968						1968	
		ACCUMULATED FUNDS					
		Reserves					
500		General	500-00				
800		Radio Z.S.	800-00				
400		Annual General Meeting	400-00				
	1,700			1,700-00			
		General Funds					
901		At 1st July, 1968	1,568-84				
		Transferred from Income and Expenditure Accounts					
488		Headquarters - Surplus	1,272-20				
1,389			2,841-04				
(180)		Radio Z.S. - Loss	776-28				
	1,569			2,064-76			
		CURRENT LIABILITIES					
792		Sundry Creditors	806-48				
104		Branch Accounts (Net)	381-81				
192		Subscriptions received in Advance	667-64				
		Provision for Cost of Z.S. Call Book	- -				
450							
	1,538			1,855-93			
		SPECIAL BEQUEST					
	200	Estate Late C.A. Wynne (Invested as per Contra)		200-00			
	R5,007			R5,820-69		R5,820-69	R5,007

1968						1968	
		FIXED ASSETS					
		Unquoted Investments					
		United Building Society					
		20 Permanent Shares of R100 each		2,000-00		2,000	
		Southern Building Society					
		500 (Permanent) Preference Shares of R2 each		1,000-00		1,000	
				3,000-00		3,000	
		Office Furniture and Equipment					
		At Cost less amounts written off		36-00		66	
					3,036-00		3,066
		CURRENT ASSETS					
		Stocks on Hand					
		Log Books	84-47			99	
		Overseas Magazines	36-72			33	
		Blazer Badges and Ties	329-70			286	
		Q.S.L. Stickers	28-59			13	
		Call Book Binders	63-60			87	
		Sundry	17-53			71	
				560-61		589	
		Sundry Debtors	453-65				
		Less Provision for Doubtful Debts	100-00				
				353-65		217	
		Cash					
		At Bankers on Current Accounts	605-51			422	
		On Savings Accounts					
		Cape of Good Hope Savings Bank	1,206-31			632	
		United Building Society	56-30			54	
		On Hand	2-31			27	
			1,870-43				
		Less Portion of Cash held for account of Estate Late C.Wynne Bequest	200-00			(200)	
				1,670-43			
					2,584-69		1,741
		INVESTMENT OF ESTATE LATE C.A. WYNNE SPECIAL BEQUEST					
		Cash at Bankers on Current and Savings Accounts			200-00		200
					R5,820-69		R5,007

H M Wilson PRESIDENT
ZS LBF

We have prepared the foregoing Balance Sheet and attached Headquarters and Radio Z.S. Income and Expenditure Accounts from the books and records of the South African Radio League and from information given to us by Officials of the League. We have satisfied ourselves as to the existence of the securities.

CAPE TOWN
17th September, 1969

CHARTERED ACCOUNTANTS (S.A.)
AUDITORS

SOUTH AFRICAN RADIO LEAGUE

HEADQUARTERS INCOME AND EXPENDITURE ACCOUNT FOR THE YEAR ENDED 30TH JUNE, 1969

1968						1968	
		ADMINISTRATIVE EXPENSES			SUBSCRIPTIONS		
160		Audit and Accountancy Fees	140-00		Gross Revenue received from Members less amounts deducted by Branches Current Subscriptions	3,971-01	4,203
48		Bank Charges	65-99				
60		Contest Expenses	77-96				
755		General Expenses	688-96				
75		Insurances	75-80		ENTRANCE FEES	61-25	51
1		Licence ZSIHQ	1-00				
568		Rent	608-40		SURPLUS ON SALES		
1,442		Salaries	1,449-95				
	3,109			3,108-06	Log Books, Overseas Magazines, Blazer Badges and Q.S.L. Stickers	554-21	286
	38	ANNUAL GENERAL MEETING EXPENSES		283-42	SUNDRY REVENUE		
		RADIO ZS			Building Society Dividends and Savings Account Interest	286-94	284
576		Subsidy	- -		Donations	31-00	33
		Contribution towards cost of space				317-94	317
72		used for Special Announcements	72-00				
648							
574		Balance of Cost of Call Books	168-73				
	1,222			240-73			
		SURPLUS OF INCOME OVER EXPENDITURE					
	488	Transferred to Accumulated Funds		1,272-20			
	R4,857			R4,904-41		R4,904-41	R4,857

RADIO ZS INCOME AND EXPENDITURE ACCOUNT FOR THE YEAR ENDED 30TH JUNE, 1969

		EXPENDITURE			ADVERTISING REVENUE	1,754-31	1,814
3,657		Cost of Production and Sundry Expenditure		4,027-59	SUBSIDIES AND CONTRIBUTIONS		
					Subsidy from Headquarters	- -	576
					Subsidy from Members Increased Subscriptions	1,425-00	1,349
					Contribution towards Cost of Space used for Special Announcements	72-00	72
						1,497-00	1,997
					SUNDRY REVENUE	- -	26
					EXCESS OF EXPENDITURE OVER INCOME		
					Transferred to Accumulated Funds	776-28	(180)
	R3,657			R4,027-59		R4,027-59	R3,657

I am pleased to be able to report again from HQ, after being down with flu, a spot of leave and a change of QTH. Changing QTH as a Radio Amateur should be against the law. This is my last!

Branch Committees

The following new Committees have been elected:-

Highveld Branch

Chairman: Reno Faber ZS6OF
Vice-Chariman: Ken Harwood ZS6BLI
Treasurer: Doug Forte ZS6ARX
Secretary: Dulcie Woolfson ZS6BAK
Member: John Smith ZS6AS

Cape Town

Chairman: Ted Baker ZS1RA
Members: Theo Karlsson ZS1P
John Lotriet ZS1JF
Sid Smith ZS1PF
Peter Atkinson ZS1-235
Brian Merskey ZS1-223
Dick Swart ZS1-001
Robert Jung ZS1-236
Barry Bokensha ZS1QM
Clyde Hyman ZS1CS

East London

Chairman: Errol N. Mack ZS2NN
Vice-Chairman: Arthur W. Gale ZS2CK
Hon. Treasurer: Colin Robertson ZS2-009
Hon. Secretary: Jan Rowntree ZS2TN
Members: Bill Laaks ZS2KW
Peter Tomlinson ZS2OF
H. Rowntree ZS2TO
Stan Geer ZS2KV
Chris Bosch ZS2OP
Gary Seymour ZS2-023

Durban Branch

Chairman: A. Hemley ZS5D
Vice-Chairman: L. de Bruin ZS5LP
Hon. Secretary: Mrs. Muriel Niell, ZS5KG
Hon. Treasurer: A. Niell ZS5GK
Members: G. Eastes ZS5YT
H. Comins ZS5HC
H. v. Rees ZS5CG
CQ News Letter: A & M. Niell ZS5GK/KG
Auditor: R. Gostelow ZS5DV

Pretoria Branch

Chairman: Doug Brooke ZS6AES
Vice-Chairman: Richie Richards ZS6ET
Hon. Secretary: Giel van Niekerk ZS6NG
Hon. Treasurer: Dick Chaplin ZS6AJM
Auditor: Andre Leeb-du-Toit ZS6AQ
Editor Watts: Doug Hutchinson ZS6-275
Steve de Wet
Members: Jo McColl ZS6-265
Gerrit Erasmus ZS6PA
Dennis Drown ZS6EK
Brian Cortlett ZS6BLZ

Southern Transvaal Branch

Chairman: Bobby Steytler ZS6ATM

Hon. Sec./Treasurer: Anna Steytler ZS6ATN

Members: Barrie Badenhorst ZS4RJ
H. Pacquay ZS4PO
Hennie Potgieter ZS6PO

Branch Transfers:

We have been asked by one of our branches to make an appeal to our members who change branches to make sure that all concerned are informed of the change. The member who changes his branch should inform his old branch and Headquarters that he is changing and both old and new branches should confirm this to Headquarters. If this is done it will save a lot of trouble all round for the records.

New and re-instated members

We wish to welcome the following new and re-instated members to our ranks and hope they will be with us for many years:

ZS5EL E. N. Lamberg — Durban Branch.
ZS5VF C. G. Baillie-Searle — Durban Branch.
ZS5-048 J. F. Steinmetz — Durban Branch.
ZS6-168 W. J. Ungerer — Johannesburg Branch.
ZS6BLF N. D. Mac Donald — Johannesburg Branch.
ZS6-170 L. Payne — Johannesburg Branch.
ZS6-171 YL. A. Gallant — Johannesburg Branch.
ZS6-172 A. Gallant — Johannesburg Branch.
ZS6-173 J. C. M. Mc Alister — Johannesburg Branch.
ZS6-174 J. F. van der AU — Johannesburg Branch.
ZS6-175 H. J. Stikarovsky — Johannesburg Branch.
G. J. Dagel — Headquarters Member.
ZS1-063 A. J. Nel — Tak Boland
ZS1-002 Barrie Taylor — Cape Town Branch.
ZS1-027 E. J. Charman — Cape Town Branch.
ZS1-022 XYL S. Mc Duling — Cape Town Branch.
ZS1-023 T. R. McDuling Cape Town Branch.
ZS1CZ H. Tronson — Cape Town Branch.
A. J. Conning — Pietermaritzburg Branch.
ZS5DZ XYL E. (Bee) Jordan — Pietermaritzburg Branch.
ZS5UW G. E. D. Greer—Pietermaritzburg Banrch.
ZS5ZR E. E. Webster — Pietermaritzburg Branch.
ZS5P J. G. Pietersen — Pietermaritzburg Branch.
ZS5-092 N. D. Mackay — Pietermaritzburg Branch.
ZS6-169 J. D. Greenway — Johannesburg Branch.
ZS2-082 B. H. Terblanche — Port Elizabeth Branch.
L. Grove — West Rand Branch.
ZS4AB T. Baillie — Tak Vrystaat.
ZS6ON G. Steyn — Tak Noord Transvaal.
ZS6AVT P. S. Klopper— Tak Noord Transvaal.
ZS6-512 J. S. Marais — Tak Noord Transvaal.
ZS6-513 R. J. Campher — Tak Noord Transvaal.
ZS6-514 J. H. de Bruyn — Tak Noord Transvaal.
ZS6-422 D. S. Cohen — Northern Johannesburg Branch.
ZS6-276 G. W. Immelman — Southern Transvaal Branch.
ZS6CS H. C. Stuivenberg — Southern Transvaal Branch.

Publications

We are pleased to let our members know that a shipment of the popular

R.S.G.B. Handbooks has been received in Headquarters office.

These are available to members at a charge of R6.00 per post or R5.50 at Headquarters office.

There are also supplies of League Ties at R1.45 each and the ZS Callbook binders at R1.20 and Radio ZS binders at R1.60.

Pirates:
None of us like "Pirates" and we hear a lot about their wrong-doings but there is one aspect which is not given sufficient publicity and that is the disappointment which is caused to genuine amateurs who make what they think is a valid contact with perhaps a rare country or one required for some award only to find out that it was a phoney one without a qsl to prove it. This aspect is shown up by a letter from H H 9DL in Haiti who writes to us to give a list of ZS/ amateurs who have sent him qsl cards for contacts which were never made by him.
Their calls and details are as follows:
ZS10, Feb. 11, 1969 – 21 Mcs, CW
ZS2OB, Feb. 27, 1969 – 21 Mcs, CW
ZS2RM, Dec. 28, 1968 – 14 Mcs, A1.
ZS5XA, Feb. 7, 1969 – 28 Mcs, CW
ZS5FE, Dec. 29, 1968 – 14 Mcs, CW
ZS5LB, Feb. 10, 1969 – 28 Mcs, CW
ZS6JK, Feb. 25, 1969 – 21 Mcs, CW
ZS6JK, Feb. 25, 1969 – 21 Mcs, A1
ZS6HR, Dec. 29, 1968 – 21 Mcs, CW
ZS6NH, Nov. 14, 1968 – 28 Mcs, CW
ZS2NS, Oct. 30, 1968 – 21 Mcs, A1

We offer our sympathy to all these ZS amateurs who were caught by some inconsiderate pirate and our thanks to HH9DL for taking the trouble to write and let us know what had happened.

Volgend A.J.V.
In 'n vorige uitgawe van Radio ZS het ek foutief besig dat die volgende A.J.V. onderneem sal word deur Tak Vrystaat, graag stel ek hierdie fout reg, die **Kroonstad Radio klub** sal dit onderneem. Jammer Tak Vrystaat.

1969 CW CONTEST

Fifty-five logs were received for the CW contest, by far the highest number ever. A detailed result sheet will be sent to all entrants. Winners are as follows.

Silent Keys Memorial Trophy
1st – Vidi La Grange ZS6AL
2nd – Percy Buckley ZS2RM
3rd – Jan Lengton ZS6BBK/4

Highest Single Band – Anon Trophy
Johan Laufs ZS3T for his 20 metre score.

Highest 40 Metre Score
Vidi La Grange ZS6AL

Highest 80 Metre Score
Jan Lengton ZS6BBK/4.

DX Winner
Ken Tremeer ZE1CU
2nd – Ian Gray ZE3JX
3rd – ZE1BO

Portable/Field Stations
No Entries

Junior (for contestants not previously having won a SARL contest,
AKYAB

Akyab Trophy
1st – Jan Lengton ZS6BBK/4
2nd – A. Ausecker ZS5LB
3rd – Ken Tremeer ZE1CU

Listeners
Winner Robert Ravensberg ZSI-039.

HOU KOERS SAAMTREK 1969

Posbus 1492,
PRETORIA.
26 Augustus 69.

Die Sekretaresse,
SA RADIOLIGA,
Posbus 3911,
KAAPSTAD.

Geagte mevrou,

Derde hou koers saamtrek op die lug

Ons is weereens versoek om 'n saamtrek op die lug vir die Voortrekkers te reel en daar is toe besluit om dit te doen op Saterdag 25 Oktober 1969. Die saamtrek sal weer soos in die verlede heeldag duur en ons nooi alle amateurs en Voortrekkers in die Republiek en Suidwes uit om deel te neem. Daar word ook beplan om 'n spesiale boodskap op 'n sekere stadium te laat uitsaai en verdere besonderhede in die verband sal so gou moontlik aan u gestuur word.

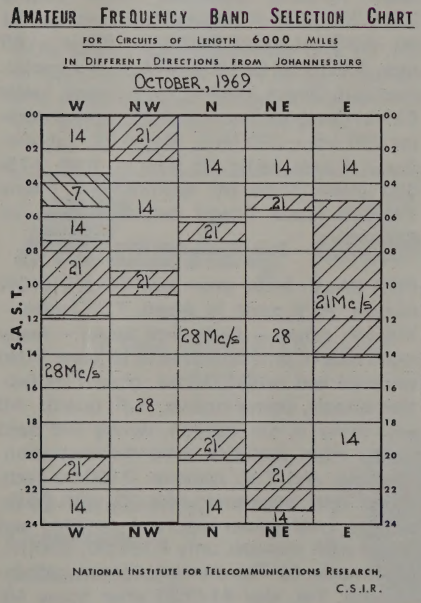
Ons het ook aansoek by the PMG gedoen vir toestemming om weer soos verlede jaar 'n Hoofstasie onder die roepsein ZS 6 VTM by die monument in Pretoria op te rig.

Sodra verdere besonderhede ivm die Saamtrek beskikbaar word sal ons dit dadelik vir u aanstuur. Intussen sal ons bly wees as u nou reeds op Sondag bulletins en in Radio ZS die Saamtrek kan Adverteer.

Enige persone is welkom om ons te kontak indien hulle wil deelneem en nie weet hoe om te werk te gaan nie. Hulle kan aan ons skryf by die tak se Posbus

Roelf Kloppers ZS6ATK
Reelings kommitee

FREQUENCY PREDICTION CHARTS



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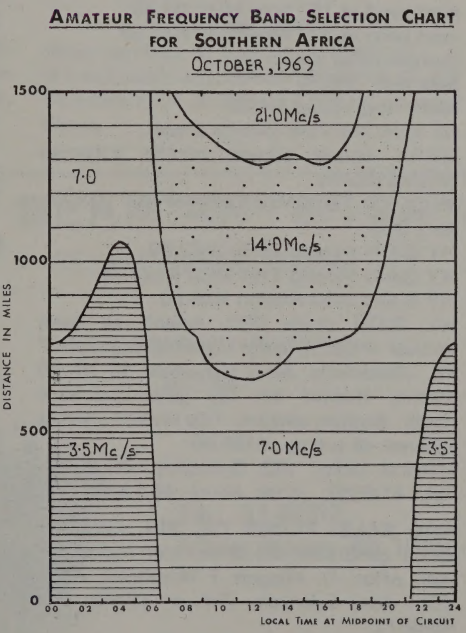

NATIONAL INTITUTE FOR TELECOMMUNICATIONS RESEARCH, C.S.I.R.

Hamads

P.O. BOX 137, CAPE TOWN — RATES: R0.50 for 20 words, 2 cents per word thereafter for members. Non-members and commercial smalls: R1.00 for 20 words, 4 cents per word thereafter. PLEASE SEND THE CORRECT AMOUNT WITH EVERY HAMAD OR SMALL.

FOR SALE: 2 Meter heathkit transceiver model HW 17. In sealed box R157.00.
S.W.R. Heathkit HM 15 A R19.95
Tunnel dipper HM10 A R35.00
Dummy load HN 31 R12.50
Electronic keyer HD 10 R49.00
Monitor SB 610 R89.00
Scanalyser SB 620 R133.00
SSB all band transceiver model HW 100 R265.00
AC power supply HP 23 R62.35
DC power supply HP 13 R78.50
100 Khz calibrator HD 20 R18.00
S.W.R. and power precision instrument 52 and 75 ohm. 2 moving coil instrument only R37.50. Omega noise bridges 2 models R25.00 and R35.00.
RM 10 R 6.73 RM 15 R 8.29
RM 20 R10.66 RM 40 R13.05
RM 80 R15.43
mast bend at 15" type MO1 R9.48
mast bend at 27" type MO2 R13.05
Bumper strap R4.75
Base ball R6.50
heavy duty spring R4.95
All those parts are chrome plated.
MARK helical triband mobile antennae arriving shortly
MOSLEY TRAPMASTER MP 33 (senior) only R81.
HY GAIN triband TH3jr R82.50
HY GAIN triband TH3 MK3 R122.25
HY GAIN quad triband R99.50
HY GAIN tower 48ft. height, all band vertical shipping weight 108lbs. Mode 1HT 18. Automatic band selection 10 to 80 metres. Rugged hot dip galvanized steel tower, bottom section. Top section mast is tapered, all tubing. R169.00
Holland radio. 143 Greenway, Greenside. Tel. 41-8557. After hours 46-1841.

FOR SALE: FLI00B TX, SSB, CW, AM. Good condition. R130 or first reasonable cash offer. D. Wiggins 1 Hazelhead Flats, 10th Ave, Edenvale, Tvl. or phone Jhb. 40-6871.

FOR SALE: Beams: 3 mono-band home-built 10-15 metres — R5 each. 20 metres — R10. Home-built phasing exciter 20 metres only R30. ZS6XK 26 Cardigan Road, Park-wood, Johannesburg. Phone 42-8576.

FOR SALE: Collins 75S-1 Receiver in excellent condition complete with matching speaker and instruction manual R350.00. Will consider 75A-4 in clean condition as part payment. Scope and HO-13 Ham-Scan apectrum monitor. Heath-Kit HO-10 Monitor complete with instruction manuals at R50.00 each or R90.00 for both. QF-1 Q-Multiplier 450-460 Kc with manual R15.00. ZS6LW Box 838 Germiston. Tel. 58-5880.

FOR SALE: Test Equipment. No reasonable offer refused. Jason A.G. 10 Audio-generator Jason P.P.20M. Stabilised Power Supply 500 V 200 M/A. AVO unviersal meter model 40. AVO AU-wave Oscillator, 95kcs — 40 mcs. AVO Test Bridge and Valve Voltmeter. Heathkit Direct reading capacitance meter CM-IU Nombrex Transistorised signal generator 220 kcs —220 Mc/s. Model 27. Labgear Audio Power meter 25 M/w — 10W. 3-15-600 ohms. View by appointment. Phone 77-5386 (Cape Town) before 10 a.m. or 6-8 p.m.

FOR SALE: Make your own TELEVISION camera. Parts made in Japan. T.V. lenses — Vidicon tubes — deflection units — ready made plug-in printboards with all parts fitted soldered and tested. Video boards deflection boards, power boards, R.F. boards. All you make is the cabinet, wiring and hard work. Also available some demonstration monitors and T.V. cameras. R150.00 each. Heath SSB transceiver HW 32 with mike, speaker, AC power supply. Assembled and tested with manuals only R100.00. ZS6UR. W. Ruurds, 65 Third street, Linden, Johannesburg. Tel. day 41-8557 after hours 46-1841.

Hamads

FOR SALE: Complete S.S.B. station comprising a K.W. 2000 Transceiver with A.C. and D.C. P.S.U. and Hustler mobile antennae for 80 and 40 meters. Forty five feet steel mast with rotator. Easy terms can be arranged. Please contact ZS4 S.I. Phone Welkom 2-7574.

FOR SALE: Viking Ranger transmitter perfect condition fitted with P.T.T. o.n.o. GELOSO G209 receiver, perfect condition. U.S.B. L.S.B. AM. C.W. etc. R90.00. Phone Home 46-9162, Bus. 23-6363. Randburg, Tvl.

FOR SALE: Heathkit SB300 Receiver. R160. Heathkit SB400 180 watt PEP matching transmitter. R160. Good order. Phone ZS6AR 78-8494, 7 Johann Rissik Drive Waterkloof, Pretoria.

FOR SALE: Dean Mrk. 1. 12v Mobile and fixed station 230v. 5" x 12" panel, 9½" deep Mrk II 12v Mobile only. Box 270, Boksburg. Transvaal.

FOR SALE: SSB Transceiver type FT 100 in mint condition at R240.00 for inspection and demonstration contact D. Kayser, P.O. Box 56, Mondeor Jhb. Phone 59-1215.

FOR SALE:
Seeing is believing — Hear you must!

SINCLAIR Q14 Speaker, driven by SINCLAIR Z12 HI-FI AMP & PRE-AMP. Powered by SINCLAIR PZ4 Stabllised mains power supply unit.

When used as stereo, SINCLAIR STEREO 25. De Luxe pre-amp and Control Unit will produce true STEREO HI-FI at a very low price.

Other SINCLAIR products available soon. Mail-orders only. S.A.E. with all enquiries please. Mail-Orders, P.O. Box 181, King William's Town.

FOR SALE: Central Electronic 10B Sideband exciter with BC458A V.F.O. both in excellent working order. R70.00.
Hallicrafters S-408 General coverage Receiver R30.00.
Contact E. Cohen ZS4MZ 12 Victoria Street Harrismith. Phone 467, or business hours 633.

PLEASE NOTE

When sending in copy for HAMADS . . . if you haven't a typewriter, PLEASE PRINT CLEARLY IN BLOCK LETTERS to avoid errors.

Mosley TRAP MASTER BEAM ANTENNAS

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R63.00

MP33 SENIOR TRIBAND
R81.00

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Greenside,
Johannesburg.**

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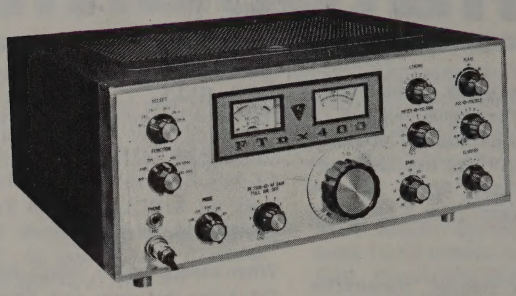
After Hours 46-1841.**

YAESU MODEL FT-DX-400 SSB TRANSCEIVER



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400 Watts PEP Input, Transistorized Linear VFO
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Frequency Stability: Less than 100 c/s Drift In 30 min Period
Receiver Sensitivity: 0.5 V, 18 Tubes 9 Semiconductors 33 Diodes

Just arrived from YAESU MUSEN
Matching solid state external VFO for split frequency operation. R59.40 nett.
Matching loudspeaker R10.80 nett.
FTDX100/150. All band transceiver 220 v A.C. and 12v D.C.
Power supplies built in. 120 Watts P.E.P. R328.50 nett.

NEW FROM JAPAN
2 Meter 7 Element Beam R5.50 nett.
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Available from mid-September:
Low priced Japanese mic compressors, C.W. Monitors, Electronic keyers, and a fabulous computerised keyer that produces perfect code.

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